Topology and quantum matter: from axions to spintronics

The confluence of fundamental symmetries (such as time reversal invariance) and relativistic quantum mechanics is known to produce emergent electronic states in crystalline solids that are accurately described using the language of topology. This talk provides an overview of this relatively young field of research, showing how the synthesis and study of topological quantum matter [1,2] yields a playground for both exotic pursuits at millikelvin temperatures (such as the realization of axion electrodynamics in condensed matter [3]) and pragmatic technologies that work under ambient conditions (such as spintronic devices [4-7]).